

# Matthew Thomas Beidler, Ph.D.

Curriculum Vitae

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## EDUCATION

### **West Virginia University**

Morgantown, West Virginia

Degree: Ph.D. in Physics

Dissertation: "Theory and Simulations of Incomplete Reconnection During Sawteeth Due to Diamagnetic Effects"

Degree: M.S. in Physics (August 2011)

Advisor: Paul A. Cassak

August 2008 - September 2015

### **Johns Hopkins University**

Baltimore, Maryland

Degree: B.S. in Physics

August 2004 - May 2008

## POSITIONS HELD

### **R&D Associate**

Plasma Theory and Modeling Group, Fusion Energy Division, Fusion and Fission Energy and Science Directorate, Oak Ridge National Laboratory

October 2018 - Present

### **US DOE FES Postdoctoral Research Program Appointment**

Department of Engineering Physics, University of Wisconsin, Madison, Wisconsin

Advisor: Chris C. Hegna

November 2016 - October 2018

### **Postdoctoral Research Associate**

Department of Engineering Physics, University of Wisconsin, Madison, Wisconsin

Advisor: Chris C. Hegna

October 2015 - October 2016

## INVITED TALKS

"Spatially-dependent simulations of runaway electron mitigation experiments on DIII-D"

62<sup>nd</sup> Annual Meeting of the APS Division of Plasma Physics, Virtual

November 2020

"Nonlinear Mode Penetration Caused by Transient Magnetic Perturbations"

Sherwood Fusion Theory Conference, Auburn, Alabama

April 2018

"Nonlinear Modeling of Mode Locked States Induced by

Transient Magnetic Perturbations"

22nd Annual MHD Stability Control Workshop, Madison, Wisconsin

November 2017

"A Self-Consistent Mechanism for Incomplete Reconnection in Sawteeth"

Sherwood Fusion Theory Conference (APS April Meeting), Atlanta, Georgia

April 2012

## REFEREED PUBLICATIONS

B.S. Cornille, **M.T. Beidler**, S. Munaretto, B.E. Chapman, D. del-Castillo-Negrete, N.C. Hurst, J.S. Sarff, and C.R. Sovinec, "Computational study of runaway electrons in MST tokamak discharges with applied resonant magnetic perturbations." *Phys. Plasmas* **29**, 052510 (2022).

C. Paz-Soldan, C. Reux, K. Aleynikova, P. Aleynikov, V. Bandaru, **M. Beidler**, N. Eidietis, Y.Q. Liu, C. Liu, A. Lvovskiy, S. Silburn, L. Bardoczi, L. Baylor, I. Bykov, D. Carnevale, D. del-Castillo-Negrete, X. Du, O. Ficker, S. Gerasimov, M. Hoelzl, E. Hollmann, S. Jachmich, S. Jardin, E. Joffrin, C. Lasnier, M. Lehnen, E. Macusova, A.

Manzanares, G. Papp, G. Pautasso, Z. Popovic, F. Rimini, D. Shiraki, C. Sommariva, D. Spong, S. Sridhar, G. Szepesi, C. Zhao, the DIII-D Team, and JET Contributors, "A novel path to runaway electron mitigation via deuterium injection and current-driven MHD instability." *Nucl. Fusion* **61**, 116058 (2021).

**M. T. Beidler**, D. del-Castillo-Negrete, L. R Baylor, D. Shiraki, and D. A. Spong, "Spatially dependent modeling and simulation of runaway electron mitigation in DIII-D." *Phys. Plasmas* **27**, 112507 (2020). *Editor's Choice*

E.E. Peterson, D.A. Endrizzi, **M. Beidler**, K.J. Bunkers, M. Clark, J. Egedal, K. Flanagan, K.J. McCollam, J. Milhone, J. Olson, C.R. Sovinec, R. Waleffe, J. Wallace, and C.B. Forest, "A laboratory model for the Parker spiral and magnetized stellar winds." *Nature Physics*. **15**, pg. 1095–1100 (2019).

**M. T. Beidler**, J. D. Callen, C. C. Hegna, and C. R. Sovinec, "Mode penetration induced by transient magnetic perturbations," *Phys. Plasmas* **25**, 082507 (2018).

**M. T. Beidler**, J. D. Callen, C. C. Hegna, and C. R. Sovinec, "Nonlinear Modeling of Forced Magnetic Reconnection in Slab Geometry with NIMROD," *Phys. Plasmas* **24**, 052508 (2017).

**M. T. Beidler**, P. A. Cassak, S. C. Jardin, and N. M. Ferraro, "Local properties of magnetic reconnection in nonlinear resistive- and extended-magnetohydrodynamic toroidal simulations of the sawtooth crash," *Plasma Phys. Control. Fusion* **59**, 025007 (2017).

P. A. Cassak, R. N. Baylor, R. L. Fermo, **M. T. Beidler**, M. A. Shay, M. Swisdak, J. F. Drake, and H. Karimabadi, "Fast Magnetic Reconnection Due to Anisotropic Electron Pressure," *Phys. Plasmas* **22**, 020705 (2015).

**M. T. Beidler** and P. A. Cassak, "Model for Incomplete Reconnection in Sawtooth Crashes," *Phys. Rev. Lett.* **107**, 255002 (2011).

## **SELECTED CONFERENCE CONTRIBUTIONS**

"KORC Modeling of Wall Heating by Avalanche Runaway Electrons During a Final Loss Event in DIII-D"

July 2022

M.T. Beidler, D. del-Castillo-Negrete, D. Shiraki, E.M. Hollmann, L.R. Baylor, IAEA 2<sup>nd</sup> Technical Meeting on Plasma Disruptions and their Mitigation

"Spatially dependent simulations and model validation of runaway electron dissipation via impurity injection in DIII-D and JET using KORC"

May 2021

M.T. Beidler, D. del-Castillo-Negrete, L.R. Baylor, J.L. Herfindal, D. Shiraki, D.A. Spong, E.M. Hollmann, M. Lehnen, C. Reux, and JET contributors, 28<sup>th</sup> IAEA Fusion Energy Conference, Nice, France (virtual)

"Modeling and Simulation of Runaway Electron Dissipation by Impurity Injection Using KORC"

October 2019

M.T. Beidler, D. del-Castillo-Negrete, D.A. Spong, L.R. Baylor, and D. Shiraki, 61<sup>st</sup> Annual Meeting of the APS Division of Plasma Physics, Fort Lauderdale, FL

"NIMROD Simulations of Forced Magnetic Reconnection in DIII-D Limited L-mode Plasmas,"

November 2018

M.T. Beidler, J.D. Callen, T.E. Evans, C.C. Hegna, M.W. Shafter, and C.R. Sovinec, 60<sup>th</sup> Annual Meeting of the APS Division of Plasma Physics, Portland, OR

"Nonlinear Modeling Benchmarks of Forces Magnetic Reconnection with NIMROD and M3D-C1,"

May 2017

M.T. Beidler, J.D. Callen, C.C. Hegna, C.R. Sovinec, and N.M. Ferraro, Sherwood Fusion Theory Conference, Annapolis, MD

“Measuring Properties of Magnetic Reconnection in Nonlinear Resistive and Two-Fluid Toroidal Simulations of Sawteeth,”  
M.T. Beidler, P. A. Cassak, S.C. Jardin, and N.M. Ferraro,  
57<sup>th</sup> Annual Meeting of the APS Division of Plasma Physics, Savannah, Georgia

November 2015

“A Model for Incomplete Reconnection in Sawtooth Crashes,”  
M.T. Beidler and P.A. Cassak  
53<sup>rd</sup> Annual Meeting of the APS Division of Plasma Physics, Salt Lake City, Utah

November 2011

## **SYNERGESTIC ACTIVITIES**

Funded through SCREAM SciDAC-4 Project  
Collaborate with CTTS SciDAC-4 Project  
Funded through DMS for Long Pulse Tokamaks Project  
Participate in ITER DMS Task Force on Runaway Electrons  
Participate in ITPA 2021 Joint Experiment on the Characterization of power deposition to PFCs by runaway electrons  
Participate as expert in ITPA MDC and DivSOL topical groups

## **LEADERSHIP EXPERIENCE**

Leader, ORNL Disruption Mitigation Group  
Scribe, US ITER Research Program Research Needs Workshop  
Member, International Sherwood Fusion Theory Conference Executive Committee  
  
Founder and President, WVU Physics and Astronomy Graduate Student Organization

April 2022 - Present  
February 2022 - Present  
April 2018,  
October 2021 - Present  
October 2013

## **HONORS AND AWARDS**

US DoE Early Career Research Award  
Fort LeBoeuf High School Wall of Fame  
US DOE FES Postdoctoral Research Program Appointment  
Travel Scholarship International ITER School in Hefei, China  
WVU University Provost Fellowship  
Student Poster Prize Sherwood Fusion Theory Conference  
Travel Scholarship International ITER School in Ahmedabad, India  
Attended the 62nd Lindau Nobel Laureate Meeting in Lindau, Germany  
Jefimenko Fellowship for Outstanding Graduate Performance in Physics

May 2021  
September 2017  
November 2016 - October 2018  
December 2015  
September 2014 - May 2015  
April 2013  
December 2012  
July 2012  
April 2012